

CLAIMS

1. An anti-microbial polymeric film comprising a polymeric substrate layer having a first and second surface and on a surface thereof a polymeric coating having a thickness of
5 from about 0.01 to about 14.0 μm and comprising an anti-microbial compound in an amount of from about 0.1 to about 50% by weight of the coating layer, characterised in that (i) said coating provides a heat-seal strength of from 100 g/in to 2500 g/in when heat-sealed to itself and/or (ii) said coating provides a barrier to water vapour and/or oxygen, such that the water vapour transmission rate is in the range of 0.01 to 10g/100 inches²/day
10 and the oxygen transmission rate is in the range of 0.01 to 10 cm³/100 inches²/day/atm.
2. An anti-microbial film according to claim 1 wherein the anti-microbial compound is in particulate form.
- 15 3. An anti-microbial film according to claim 1 or 2 wherein the anti-microbial compound is present in an amount of from about 0.1 to about 5%
4. An anti-microbial film according to claim 1, 2 or 3 wherein the anti-microbial compound is an inorganic compound containing a metal or metal ions selected from silver,
20 copper, zinc, tin, mercury, lead, iron, cobalt, nickel, manganese, arsenic, antimony, bismuth, barium, cadmium and chromium.
5. An anti-microbial film according to claim 1, 2 or 3 wherein the anti-microbial compound has the formula $M^1_a H_b A_c M^2_2 (PO_4)_3 \cdot nH_2O$ wherein:
25 M^1 is at least one metal ion selected from silver, copper, zinc, tin, mercury, lead, iron, cobalt, nickel, manganese, arsenic, antimony, bismuth, barium, cadmium and chromium;
A is at least one ion selected from an alkali or alkaline earth metal ion;
 M^2 is a tetravalent metal ion;
a and b are positive numbers and c is 0 or a positive number such that $(ka + b + mc) = 1$;
30 k is the valence of metal M^1 ;
m is the valence of metal A; and
 $0 \leq n \leq 6$.

6. An anti-microbial film according to claim 1, 2 or 3 wherein the anti-microbial compound has the formula $\text{Ag}_a\text{H}_b\text{A}_c\text{Zr}_2(\text{PO}_4)_3.n\text{H}_2\text{O}$ wherein:
A is an alkali or alkaline earth metal ion;
a, b and c are positive numbers such that $(a + b + mc) = 1$;
5 m is the valence of metal A;
 $0 \leq n \leq 6$.
7. An anti-microbial film according to claim 5 or 6 wherein a is in the range 0.1 to 0.5.
- 10 8. An anti-microbial film according to claim 5, 6 or 7 wherein b is at least 0.2.
9. A film according to any of claims 5 to 8 wherein the metal A is sodium and m is 1.
- 15 10. A film according to any preceding claim wherein the anti-microbial compound contains silver, copper or zinc.
11. A film according to any preceding claim wherein the anti-microbial compound contains silver.
- 20 12. An anti-microbial film according to any of claims 1 to 11 wherein said coating provides a water vapour transmission rate in the range of 0.01 to 10 g/100 inches²/day, and/or an oxygen transmission rate in the range of 0.01 to 10 cm³/100 inches²/day/atm.
- 25 13. An anti-microbial film according to any of claims 1 to 12 wherein said coating provides a heat-seal strength of from 100 to 2500 g/in when heat-sealed to itself.
14. An anti-microbial film according to any preceding claim wherein the haze of the film is less than 15%.
- 30 15. An anti-microbial film according to any of claims 2 to 14 wherein the volume distributed mean particle diameter of the anti-microbial particles is in the range of 1.0 to 3.0 μm .

16. An anti-microbial film according to any of claims 2 to 15 wherein the thickness of the coating layer is in the range of 70 to 130% of the volume distributed mean particle diameter of the anti-microbial particles.

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17. An anti-microbial film according to any of claims 2 to 15 wherein the thickness of the coating layer is less than the volume distributed mean particle diameter of the anti-microbial particles, preferably such that thickness is in the range of 70 to 99 % of the volume distributed mean particle diameter of the anti-microbial particles.

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18. A film according to any preceding claim wherein said polymeric substrate is selected from polyester, polyolefin, polyamide and PVC.

19. A film according to any preceding claim wherein said polymeric substrate
15 comprises polyester.

20. A film according to any preceding claim wherein said polymeric substrate comprises polyethylene terephthalate.

20 21. A film according to any preceding claim wherein said polymeric substrate has a degree of shrinkage in one or both dimensions of about 10% to about 60% when placed in a water bath at 100°C for 30 seconds.

22. A film according to any preceding claim wherein the gloss is at least 70.
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23. A film according to any of claims 1 to 22 wherein the polymer of a coating layer is selected from PVDC, PCTFE, PE, PP, EVOH, PVOH, EVA, polyester and caprolactone.